

Strait Flow Monitoring Using Trawl Resistant Bottom Mounted Acoustic Doppler Current Profilers

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LONG-TERM GOALS

The long-term goal is to determine the seasonal reversal South China Sea – Indonesian Seas Transport/Exchange (SITE) flow and its influence to primary Indonesian throughflow (ITF) and dynamics of South China Sea (Figure 1).

OBJECTIVES

The main objectives are (1) to measure the magnitude and its variability of the water mass transport/exchange between the Indonesian Seas and South China Sea (SCS) in the Karimata Strait; (2) to determine the effects of this flow and property flux from the tidal to seasonal variability on the circulation and mesoscale dynamics in the internal Indonesian Seas and the South China Sea.

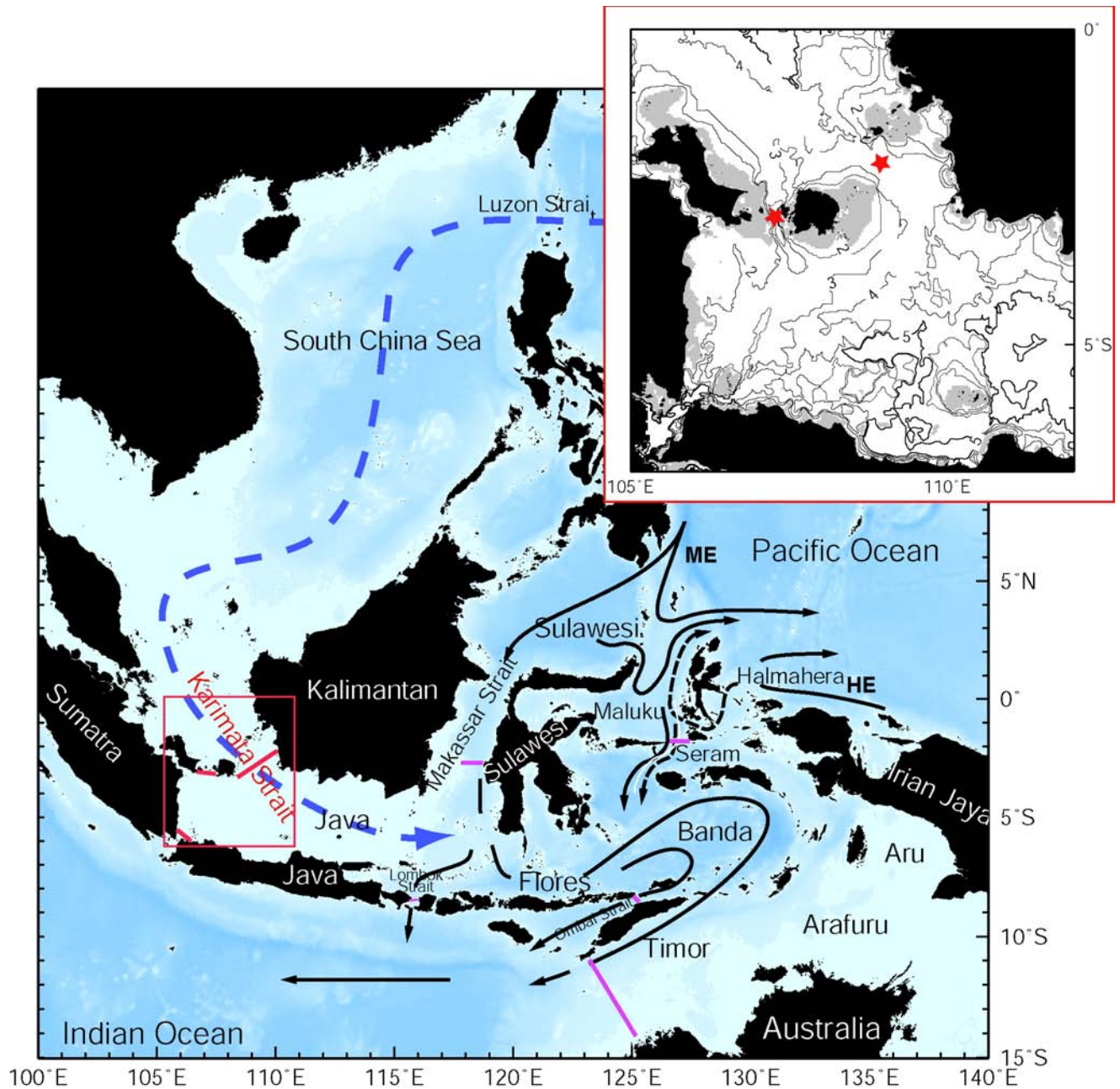
APPROACH

- ✓ To have international collaborative research between the United States and Indonesia by deploying an array of two TRBM ADCPs to measure the velocity, salinity, and temperature in the Karimata Strait. We plan to use Indonesian Research Vessel Baruna Jaya VIII, which had been used for our previous Indonesian throughflow program.
- ✓ We plan to deploy for an 18-month period with a 9-month turn-around deployment. Each cruise will take 4-5 days. The first deployment is planned for mid-2007.
- ✓ To combine with INSTANT data to determine the effects of the SITE flow and its interaction with the primary Indonesian throughflow and their consequences to stratification, upwelling and mesoscale features in the Lombok Strait and other straits to the east.

WORK COMPLETED

Currently, we are discussing with Indonesian partner from the Agency for Marine Affairs and Fisheries Research (BRKP) about the cruise plan, Research Vessel Baruna Jaya VIII time allocation, and research clearance issues. On the process of ordering the set of TRBM which includes the Workhorse sentinel 600kHz ADCP, the microcat with CTP and pump, the house of trawl resistance bottom mounted AL-200 is manufactured, the coastal acoustic release/transponder, acoustics command deck unit, and Argo beacon.

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[Figure 1. ITF pathways and INSTANT mooring locations (magenta lines) and the proposed TRBM locations in the Karimata Strait (red-stars in the insert)]

RESULTS

Implementation agreement of the mutual collaborative research with the Agency for Marine and Fisheries Research (BRKP), Indonesia is being discussed.

IMPACT/IMPLICATIONS

Despite the importance of the Karimata Strait flow for marine shipping and industry and the significance of the water exchange on regional ocean circulation and climate, there has been no previous field measurement of this SITE flow. A strong seasonal variability of the SITE due to monsoon strongly affects the main ITF and heat-flux into the Indian Ocean. Gordon, Susanto, and Vranes (2003) suggested that Java Sea water influences the vertical velocity profile of ITF in the Makassar Strait, thereby affecting the heat flux to the Indian Ocean and their air-sea interaction. The SITE flow also affects the heat balance in the SCS, which may in turn affect cyclone/typhoon development.

RELATED PROJECT

There is an ongoing international [Indonesia, United States, Australia, France, and the Netherlands] collaborative research called INSTANT, with the primary objective to measure the variability of the ITF and its associated heat and freshwater flux exported into the Indian Ocean. INSTANT PI's have deployed 11 moorings in major inflow passages from the Pacific Ocean (Makassar Strait & Lifamatola Passage) and outflow passages to the Indian Ocean (Lombok and Ombai Straits, and Timor passage; Gordon, 2004; Sprintall *et al.*, 2004). Turn around deployment conducted on June-July 2005 and the data are being processed. The final recovery is being plan for November-December 2006. One of Makassar mooring will be redeployed during the INSTANT cruise recovery, however, there is no funding has been committed nor the time frame for its recovery.

REFERENCES

- Fang, G, R.D. Susanto, I. Soesilo, Q. Zheng, F. Qiao and Z. Wei, Notes on the upper-layer interocean circulation of the South China Sea, *Advances in Atmospheric Sciences COAA Special Issue*, 22, 6, 946-954, 2005.
- Gordon, A. L., R. D. Susanto, and K. Vranes (2003) Cool Indonesian Throughflow is a Consequence of Restricted Surface Layer Flow, *Nature*, 425, 824-828.
- Sprintall, J., S. Wijffels, A. L. Gordon, A.Ffield, R. Molcard, R. D. Susanto, I. Soesilo, J. Sopaheluwakan, H. M. van Aken (2004) A New International Array to Measure the Indonesian Throughflow: INSTANT, *EOS*.
- Susanto, R.D. and A.L.Gordon, Velocity and transport of Indonesian throughflow in Makassar Strait, *J. Geophys. Res.*, 100, C1, 2005.

PUBLICATIONS

No publication has been published in this research.